ORNAMENTAL PLANT GERMPLASM CENTER

OPGC Quarterly Newsletter
Summer 2005 Vol. 1.3

Director's Introduction

This is the third issue of the OPGC Newsletter. In this issue, we want to highlight some of our activities at the Center. Since its official inauguration in July 2001, the center is developing into a fully functional genebank. In this issue, we have a story on our efforts to collect native flowers in Ohio in collaboration with the Ohio Department of Natural Resources and in Pennsylvania. Our total number of accessions now surpasses 3,000. This achievement has been attained because many of our cooperators (see our website at **http://opgc.osu.edu**) have donated germplasm, materials for our work, and others volunteer their time and expertise.

The story on our Tissue Culture Laboratory shows the progress to date. This growing season is our third year in producing seed in the field, and the story gives a brief description of our experience gained. Similarly, in our greenhouse we are continuing to automate its operation, and we provide a story on the installation of an irrigation system. However, let us start off the reading with a story on how we use our germplasm in landscaping our building – the "OPGC Garden."

David Tay, PhD
Director

OPGC Garden – by Art Wells, Research Assistant

Purpose: We desired to create an attractive, interesting, and low maintenance garden utilizing plants from our collection to beautify the grounds and raise public interest in the OPGC.

Planning: The first step in designing the garden was to take an inventory of perennials and woody plants already in the garden. We then measured the remaining area of available bed space, estimated the number of plants needed to fill the area, and then began selecting plants.

Selection: The annual portion of this year's garden featured the genus *Pelargonium*. We chose accessions on the basis of flowering, foliage effect, or simply being unusual or unfamiliar plants. Many have unique variegations, zonations, venations, and textures. We selected 22 accessions to be planted in drifts of 15 plants each for a total of 330 plants. Among these, three species and four scented accessions were used.

Propagation: We took 16 cuttings from each accession, rooted them in cell packs of soilless media. We selected the best 15 for transplanting.

Transplanting: When the roots of the cuttings filled out the pack, we transplanted them to 4 ½" geranium pots of soilless media, and arranged pot-to-pot in 15-pot-shuttle trays.

Pinch: We removed the apical meristem of each plant to encourage branching. With the exception of two very upright species, all branched well showing good form without the use of chemical plant growth regulators.

Grow: These were regularly fed a 20-10-20 soluble fertilizer at a rate of 300 ppm; they were also given clear water occasionally to leach any excess salts. As they grew, we doubled the spacing between the plants.

Bed prep: We weeded the bed, turned the soil, and amended with organic material. We also arranged soaker hose throughout the bed for irrigation.

Planting: On May 14, 2005 we planted the garden. Spacing varied between 12" and 18" on center, given the variability in size of the accessions used. Each plant was given slow release fertilizer upon planting, as well as a "starter charge" of soluble fertilizer after the planting was completed.

Maintenance: Garden maintenance included application of granular pre-emergent herbicide, occasional weeding and deadheading, and regular use (2-3 times a week) of the soaker hose. The *Pelargonium* look great, having performed very well during the dry summer we have had. We encourage you to visit the OPGC and enjoy our display.

After planting on May 14, 2005.

Planting on May 14, 2005.

In full bloom on June 24, 2005.

Germplasm Collecting - by Susan Stieve, Seed Crop Curator

We have been on germplasm collecting trips in Pennsylvania and Ohio during the spring and summer of 2005.

On May 19, Eric Renze and I collected violets with Gary Sherwin in the Dunbar Hills State Game Land #51 of Fayette County, Pennsylvania. Gary is the President of the American Violet Society and kindly offered to show us where various species of *Viola*, an OPGC priority genus, could be found in the over 16,500 acres of the game land. We visited 7 sites that day and collected plants of twelve species; since many species were obtained from more than one site we collected a total of 52 accessions. Gary sent four more accessions, including two additional species, to the OPGC the following week.

Eric Renze, OPGC Research Assistant (top) and Gary Sherwin, American Violet Society President, collecting *Viola* in the Dunbar Hills region of Pennsylvania.

Eric Renze (left), Rick Gardner, and Jennifer Ehrenberger collecting *Viola Rafinesquii* at Sandy Springs Cemetery, Adams County, Ohio.

Russell Eckley collecting *Rudbeckia hirta* seed

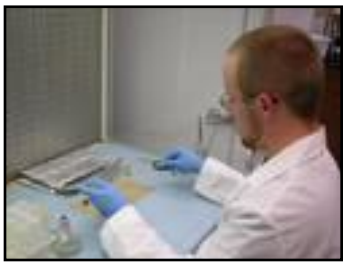
Collected violets were planted in pots and are doing well in the greenhouse. Many have continued to flower and are producing significant amounts of seed; our goal is to produce 10,000 seeds per accession. My thanks, again, to Gary for all of his valuable help!

OPGC personnel have also participated in three collecting trips so far this year with Rick Gardner, Botanist for the Division of Natural Areas and Preserves, Ohio Department of Natural Resources. With Rick's help we focused on collecting OPGC priority and other genera in the southern region of Ohio, focusing on Adams County. During collection trips to nature preserves operated by the Ohio Division of Natural Areas and Preserves and The Nature Conservancy we have collected 101 accessions, 62 of which are accessions of priority genera. There are two more collection trips scheduled for this fall to obtain seed of summer-blooming plants.

OPGC New Tissue Culture Laboratory – by Jennifer Ehrenberger, Clonal Crop Curator

Jennifer Ehrenberger started as the new curator for the Ornamental Plant Germplasm Center on January 5, 2004. She is responsible for curating the collection of vegetatively propagated plants, including the priority genera *Begonia, Chrysanthemum, Euphorbia, Hemerocallis, Narcissus and Pelargonium*.

Jennifer Ehrenberger, Curator, checking the growth of a meristem tissue culture.



Art Wells, Research Assistant, working at a laminar flow hood, subculturing *Pelargonium*.

During Jennifer's first months at the OPGC, she was responsible for converting a room in Howlett Hall at The Ohio State University into a tissue culture laboratory, a joint collaboration with the Department of Horticulture and Crop Science.

Jennifer and Art Wells, Research Assistant, and Russell Eckley, Research Aide, traveled to Oglevee in February 2004. Oglevee is one of the leaders in the *Pelargonium* industry. At Oglevee they observed methods of media preparation, meristem tip culture, micro-propagation and to discuss cooperation in this field. Since that time they have been doing their best to implement those methods. Student workers have been trained to use proper tissue culture methods to assist Jennifer and Art.

Over 874 different *Pelargonium* accessions have been donated to the OPGC due to the valuable contributions of Chuck Heidgen from Shady Hill Greenhouses and Dr. Richard Craig at Penn State University. Currently approximately 300 accessions of *Pelargonium* have been backed up in tissue culture, and experimentation is now being done to slow down the growth of *in vitro* plant materials for long-term conservation.

Since February 2005 Li Xu has been volunteering every Thursday and Friday to help in the OPGC Tissue Culture Laboratory. The clonal crops team would like to thank Li for all of her efforts!

Li Xu, a volunteer subculturing *Pelargonium*.

2005 Field Production – by Eric Renze, Research Assistant

Our field is located at Waterman Farm, on the Ohio State University Columbus campus, where this year we are growing 85 plant accessions. To isolate plants from cross-pollination during flowering, cages that are 21 feet long and 7 feet wide are used along with screens that are placed over the cage.

Seed pollination cages at Waterman Farm, The Ohio State University, Columbus Campus

Bumblebee hives are placed into the cages at the time of flowering for pollination. A hive consists of a queen and about 100 female bumblebees. Hives can be rotated through the cages as plants finish flowering and others start to flower.

Bumblebee hive in a seed pollination cage

Before cages were constructed, rows of black plastic mulch and T-tape were laid out. The black plastic mulch helps in weed control and keeping the soil moist during dry periods. The T-tape is under the black plastic mulch and is the way we water our plants. It is very similar to a soaker hose. At planting time holes are burned into the black plastic and osmocote fertilizer is added to the planting hole. Typically, a cage will have one to two accessions planted in it, and can have 60 plants planted in it.

An *Asclepias* accession growing in a screen cage.

Seed was sown in the winter in cell packs and plants were planted out in the field in spring and early summer. Many of the plants this year are from collection trips made by the USDA and seed that needed to be regenerated due to low viability or low seed quantity.

Daily duties include weeding, staking, management of bumblebees, and seed harvesting. Seed harvesting typically occurs from late spring through the fall. We have a goal of 10,000 seed for each accession. Since most of our plants are perennial, we will continue to harvest seed the following year if we fall short of this goal. At the end of the season, screens are taken off and cleaned. Cages remain up through the winter.

Jillian Ervin, a Federal Work-Study student, harvesting ripened seed.

Automatic Irrigation Systems in OPGC Greenhouse – by Russell Eckley, Research Aide

An important milestone achieved this summer at the OPGC has been the addition of irrigation systems in the greenhouse. The choice was between drip and capillary mat irrigation. Both have their benefits and drawbacks. Drip irrigation has the benefit of delivering irrigation directly to the surface of the media in each pot. Salt buildup is minimized and flow is accurately controlled. Although salt buildup and flow control can be a problem with capillary mats, the most problematic aspects of capillary mat use are algae buildup and the spreading of diseases across the mat. To its credit though, the cost of capillary mat is much lower than dripper systems.

Laying down the first of the capillary mat. (Donated by Justin Marotta, Possum Run Greenhouse.)

A thoughtful donation of capillary mat by Possum Run Greenhouse made our decision much easier. All the table top components required for capillary mat operation of one room was donated. After installation and a few adjustments were completed, it was clear that we would have much success using the capillary mat.

The first room with capillary matting is a *Pelargonium* room. We are finding that cap-mat works well.

At this time we have capillary mat irrigation installed in six of the eleven compartments. All are operating well and are saving man hours every day, enabling workers to move on to other tasks. One final room is to have a capillary mat system finished by the end of August.

Due to the limited space in the Howlett greenhouse propagation mist room and the high demand for that space, the OPGC made the decision to have our own mist room. This will not only guarantee availability for rooting cuttings and starting seeds, it will most likely have fewer pathogens and insect problems. The Howlett mist room runs constantly, while ours will only run when needed, allowing the room to dry out often.

Algae growth has been only a minor problem. Physan, an algaside, has kept algae levels to a minimum. One bench in each room is loaded with less permanent stock, affording opportunities to sequentially vacate benches for algae treatment.

Problems with disease transmission have not yet occurred. Caretakers are vigilant with regard to rooting into the matting, abscised foliage, and flow control. It is encouraging that no visible deterioration of the capillary matting has so far been observed.

Solenoid valves control flow.

Headers distribute water to three dripper lines on each table.

Standpipes for the fully operational system.

OPGC Endowment: If you want to contribute to the Endowment please contact Dr. David Tay, Director, OPGC, 670 Vernon Tharp Street, Columbus, OH 43210.

Phone: 614-292-3708
Fax: 614-292-3768
E-mail: tay.9@osu.edu